

## *Myersina nigrivirgata*, a New Species of Goby from Okinawa Prefecture in Japan

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**Abstract** *Myersina nigrivirgata*, a new species of goby, is described from specimens from Iriomotejima, Okinawa Prefecture, Japan. It has the following characteristics: the gill membranes are connected across the isthmus; the vomer with a pair of longitudinal ridges at the central part of its lower surface and without lateral processes; a black lateral band running from behind the eye to the end of the caudal fin.

A species of goby was collected in 1980 and 1981 at Iriomotejima, an island in southern Okinawa Prefecture. This species is close to *Myersina macrostoma* Herre (type locality: Philippines) and we describe it herein as a new species of the genus *Myersina*. Specimens of *M. macrostoma* were collected at Ishigakijima, an island near Iriomotejima (Prince Akihito and Meguro, 1978). For reference *Amblyeleotris japonica* Takagi, *Cryptocentrus filifer* (Valenciennes), *Cryptocentrus singapurensis* (Herre), *Mars caeruleomaculatus* Herre and *Stonogobiops* sp. which was reported as *Cryptocentrus* sp. by Masuda et al. (1975: 92-B, 277) were compared with the above two species of *Myersina*.

### *Myersina nigrivirgata* sp. nov.

(New Japanese name: Kuroobihaze)  
(Fig. 1)

**Holotype.** YCM (Yokosuka City Museum)-P. 7592, 79 mm in standard length (SL), female, 24°19'N, 123°44'E, Amitori Bay, Iriomotejima, Okinawa Pref., Japan, August 21, 1980.

**Paratypes.** One specimen, YCM-P. 7485, 45 mm SL, female, same data as holotype. Two specimens, NSMT (The Department of Zoology, National Science Museum (Natural History Institute), Tokyo)-P. 21406, 45 mm SL, male and NSMT-P. 21407, 48 mm SL, female, same locality as holotype, July 30, 1981. Two specimens, OPM (Okinawa Prefectural Museum, Naha)-P. 1, 34 mm SL, male and OPM-P. 2, 38 mm SL, female, same data as NSMT-P. 21406. One specimen, AMS (Australian Museum, Sydney) I. 22760-001, 42 mm

SL, female, same data as NSMT-P. 21406. Two specimens, LICPP (Laboratory of Ichthyology, the Crown Prince's Palace, Tokyo) 1981030-1, 41 mm SL, female, LICPP 1981030-2, 45 mm SL, female, same data as NSMT-P. 21406; stained by Arizarin Red S.

In this paper counts and measurements of the holotype are shown with no parentheses; while those of the paratypes are in parentheses.

**Diagnosis.** Gill membranes connected across isthmus. Vomer with a pair of longitudinal ridges at central part of its lower surface and without lateral processes. A black lateral band running from behind eye to end of caudal fin.

**Description.** Dorsal fin rays VI-I, 10 (VI-I, 10), anal fin rays I, 9 (I, 9), pectoral fin rays 17 (17 except for one specimen which has 18), pelvic fin rays I, 5 (I, 5), segmented caudal fin rays  $9+8=17$  ( $9+8=17$ ). Number of scales is shown in Table 1.

Head at posterior margin on preopercle and body at origin of pelvic fins both compressed. Head length 29% (30~31%) of standard length. Anterior nostril tubular reaching upper margin of upper lip. Posterior nostril not tubular. Eye diameter 22% (25~29%) of head length. Interorbital space slightly wider than half eye diameter in the holotype, narrower than half eye diameter in the paratypes. Least distance between eye and upper margin of upper lip 31% (21~30%) of eye diameter. Jaws nearly equal, lower jaw slightly protruding. Length of maxillary not different between sexes. Tips of tongue and glossophary not notched, free from base of mouth. Arrangement of teeth



Fig. 1. *Myersina nigrivirgata* sp. nov. Above, holotype, YCM-P. 7592, female, 79 mm SL, and below, paratype, NSMT-P. 21406, male, 45 mm SL, from Amitori Bay, Iriomotejima, Okinawa Pref., Japan.

is shown in Fig. 2; middle part of lower jaw in two rows, ending distally in a single row. Gill membranes connected across isthmus. Urogenital papilla of male pointed at tip and more slender than female, that of female rounded at tip.

Gill rakers on first and second right gill arches in the two stained specimens (LICPP 1981030-1 and LICPP 1981030-2) are as follows (Fig. 3). Gill rakers on outer face of upper limb of first

gill arch unossified and tubercular, except for one gill raker with a stained spot in each specimen. Gill rakers on outer face of lower limb of first gill arch ossified and elongated with unossified processes on inner side; the lowermost two gill rakers not elongated in one specimen (LICPP 1981030-1); in the other specimen (LICPP 1981030-2) unossified. Length of the uppermost gill raker on lower limb three times longer than width of ceratobranchial.

Table 1. Counts of *Myersina nigrivirgata* sp. nov.

	Holotype	Paratypes				
	YCM-P. 7592 (N=1)	YCM-P. 7485	NSMT-P. 21406 and 21407 (N=2)	OPM-P. 1 and 2 (N=2)	AMS I. 22760-001 (N=1)	LICPP 1981030 (N=2)
Standard length (mm)	79	45	45, 48	34, 38	42	41, 45
Sex	♀	♀?	♂, ♀	♂, ♀	♀	♀, ♀
Scales in a longitudinal series	120	115	116, 117	106, 108	110	113, 114
Scales in a transverse series	38	38	37, 38	36, 37	37	37, 38
Predorsal scales*	27	25	21, 24	10, 19	27	18, 23

\* Counted from the anteriormost scales off the midline to the scales in line with the anterior base of the first dorsal fin.

Number of gill rakers on outer face of first gill arches both  $4+17$  including unossified gill rakers. Gill rakers on inner face of upper limb of first gill arch are ossified lumps with one or two spines in one specimen (LICPP 1981030-1); in the other specimen (LICPP 1981030-2) the uppermost two gill rakers are unossified. Gill rakers on inner face of lower limb of first gill arch unossified and tubercular, except for the uppermost gill raker which is similar to gill rakers on inner face of upper limb; two gill rakers with single stained spots in one specimen (LICPP 1981030-1). Number of gill rakers on inner face of first gill arch  $5+18$  (LICPP 1981030-1) and  $5+19$  (LICPP 1981030-2) respectively. Gill rakers on outer face of upper limb of second gill arch ossified and short with one to four spines on top in one specimen (LICPP 1981030-1); in the other specimen (LICPP 1981030-2) the lowermost two gill rakers unossified. Gill rakers on outer face of lower limb of second gill arch unossified and tubercular in one specimen (LICPP 1981030-2); in the other specimen (LICPP 1981030-1) gill rakers are mostly unossified, except for the uppermost gill raker and the second, third and fourth gill rakers from the lower end, all of these ossified gill rakers are similar to ossified gill rakers on outer face of upper limb of second gill arch; the lowermost gill raker is unossified. Number of gill rakers on outer face of second gill arches  $4+15$  (LICPP 1981030-1) and  $5+15$  (LICPP 1981030-2) respectively. Gill rakers on inner face of upper and lower limbs of second gill arch ossified and short with more than two spines on top. Number of gill rakers on inner face of second gill arches  $5+20$  (LICPP 1981030-1) and  $4+19$  (LICPP 1981030-2) respectively.

Shape and length of fins not different in sexes. Tip of first dorsal fin reaching base of third soft ray of second dorsal fin on the holotype and first spine to third soft ray on the paratypes when depressed. The longest spine the third ( $N=8$ , including the holotype) or second ( $N=1$ ). First spine shorter than both the second and the third. Pelvic fins fully united between the fifth rays which are the longest. Smooth pelvic frenum nearly reaching tips of spines. Caudal fin pointed, its length almost equal to head length.

Head and body anterior to pectoral fins and

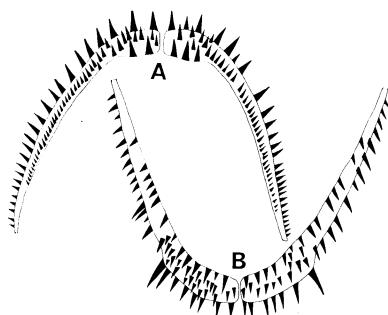


Fig. 2. Diagrammatic tooth arrangement in upper (A) and lower (B) jaws of *Myersina nigri-virgata* sp. nov., paratype, LICPP 1981030-1, female, 41 mm SL.

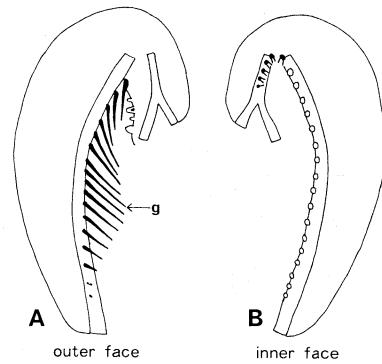


Fig. 3. Right first gill arch of *Myersina nigri-virgata* sp. nov., paratype, LICPP 1981030-1, female, 41 mm SL. The parts of the gill rakers stained by Arizarin Red S are indicated in black. g, gill raker.

pelvic fins naked except for a strip anterior to pelvic fins. Midline before first dorsal fin with a few cycloid scales. Other part of body covered by cycloid scales.

Anterior oculoscapular canal with pores B', C (single), D (single), E, F, G and H'; posterior oculoscapular canal with pores K' and L'; preopercular canal with pores M' and O' (Fig. 4). Individual differences are found as follows: one specimen (LICPP 1981030-1) shows closely and irregularly paired pores between pores C and D, and one additional pore between pores G and H' in left side; one specimen (OPM-P. 2) without posterior oculoscapular canal in right side; one specimen (OPM-P. 1) without posterior oculoscapular canal in both sides; one specimen (LICPP 1981030-2) with preopercular canal with pore N between pores M' and O'.

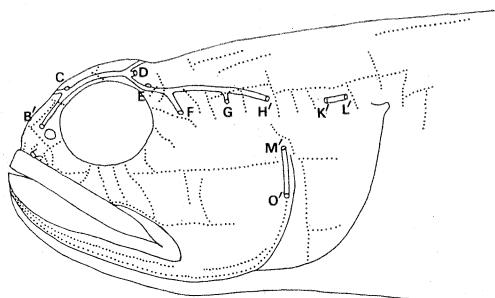


Fig. 4. Sensory canals and sensory papillae of *Myersina nigrivirgata* sp. nov., holotype, YCM-P. 7592, female, 79 mm SL. B'~H', anterior oculoscapular canal pores; K'~L', posterior oculoscapular canal pores; M'~O', preopercular canal pores; apostrophes indicate that these pores are terminal.

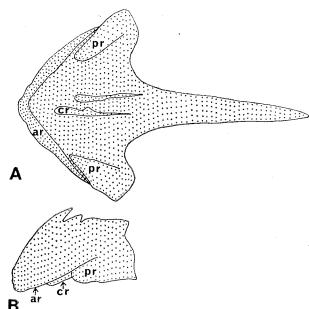


Fig. 5. Ventral (A) and lateral (B) views of vomer of *Myersina nigrivirgata* sp. nov., paratype, LICPP 1981030-1, female, 41 mm SL. ar, anterolateral ridge; cr, central ridge; pr, posterolateral ridge.

Arrangement of sensory papillae is shown in Fig. 4. Four transverse lines of sensory papillae below eye.

Vomer with a pair of longitudinal ridges at central part of its ventral surface; in one illustrated specimen (LICPP 1981030-1) posterolateral sides ridged and anterolateral sides with low ridge, anterolateral sides extending lower outside posterolateral ridges (Fig. 5); in the other specimen (LICPP 1981030-2) anterior tip with a pair of protuberances, lateral sides ridged extending forward and discontinuous with anterior protuberances. Lower postcleithrum present. Scapula not ossified.

Number of vertebrae  $10+16=26$ , one specimen (LICPP 1981030-2) with two vertebrae deformed. First and second pterygiophores of first dorsal fin inserted between neural spines

of third and fourth vertebrae, third and fourth pterygiophores between those of fourth and fifth, fifth pterygiophore between those of fifth and sixth, sixth pterygiophore between those of sixth and seventh. First and second pterygiophores of second dorsal fin spanning neural spine of ninth vertebra. Caudal skeleton with one epural.

Colour of the holotype in preservation. Upper parts of head and body dusky; a dark lateral band running from behind eye to end of body; posterior part of cheek and opercle with light spots. First dorsal fin dusky with irregular pale markings and dark blotches on tips of fourth, fifth and sixth spines. Second dorsal fin dusky with unpigmented band in upper part margined with pigmentation. Anal fin dusky with tip of membranes unpigmented. Caudal fin pale; central part slightly darker. Pectoral and pelvic fins pale.

Colour of the paratype (female, NSMT-P. 21407) in life. Head and body dark brown, pale abdominally. A black lateral band running from behind eye to end of body. Seven pale transverse bands above the band: two below first dorsal fin, three below second dorsal fin, one at caudal peduncle, one below procurrent rays of caudal fin. Posterior part of cheek and opercle with light purple spots. First dorsal fin greyish purple with transparent irregular markings and at margin of fin with blackish blotches, a blotch on tip of fifth spine most conspicuous. Each membrane between rays of second dorsal fin with four longitudinal bands: one on upper edge, two at middle part slanting upwards and one near base. Caudal fin greyish purple; upper part transparent below greyish purple margin; three longitudinal black stripes on rays with an additional blackish stripe below them; all are continuations of black band on body. Two reddish stripes appear on the membranes between each black and blackish stripe. Anal, pectoral and pelvic fins transparent.

Colours of the paratypes in preservation do not differ according to sex.

**Habitat.** Specimens were collected at the head of Amitori Bay off the mouths of the Ayanda and Udara Rivers. The depth of the water was 4~5 m at low tide and the substratum was muddy sand. Burrows, 2~3 cm in diam-

eter, opened from the bottom of conically excavated holes 15~70 cm in diameter and 7~30 cm in depth. Single individuals were sometimes seen hovering about 10 cm above such holes. As yet, there is no evidence that this species is associated with snapping shrimps.

**Etymology.** The name for this species is taken from the characteristic of a black lateral band.

**Comparisons between *Myersina nigrovirgata* and *Myersina macrostoma*.** *Myersina nigrovirgata* differs from *Myersina macrostoma*, the type species of the genus *Myersina*, in the latter's following characteristics: vomer with lateral processes and without a pair of central ridges; conspicuously protruding lower jaw; single row of teeth from middle to posterior part of lower jaw; more developed first dorsal fin with first or second spines being longest; longer and truncate caudal fin in the male; no posterior oculoscapular canal; six transverse lines of sensory papillae below eye (cf. Prince Akihito and Meguro, 1978).

**Relationship.** Comparisons of *Myersina nigrovirgata* with *Myersina macrostoma*, *Cryptocentrus filifer*, *Cryptocentrus singapurensis*, *Mars caeruleomaculatus* and *Stonogobiops* sp. reveal that all of them share the following characteristics. These characteristics include ossified gill rakers on the outer face of the lower limb of the first gill arch and on the inner face of the lower limb of the second gill arch; unossified gill rakers on the inner face of the lower limb of the first gill arch and on the outer face of the lower limb of the second gill arch; the unossified scapula.

From our observations on gill rakers in various gobiids, it is found that patterns of ossified and unossified gill rakers in these species are not common, and the patterns of ossification of gill rakers of gobiids are mostly consistent among the species in any one genus. In the case of scapula, an unossified scapula is found among various gobiids which are not considered to be closely related, but the types of scapula are mostly consistent among the species in any one genus (Prince Akihito, 1963, 1967). The fact that these species have the above characteristics in common is considered as evidence that they are closely related.

The genus *Amblyeleotris* was synonymized

with the genus *Cryptocentrus* by Polunin and Lubbock (1977). *Amblyeleotris japonica*, however, has only ossified gill rakers and an ossified scapula, and the genus is not considered to be closely related to the above-mentioned genera.

Among *M. nigrovirgata*, *M. macrostoma*, *C. filifer*, *C. singapurensis*, *Mars caeruleomaculatus* and *Stonogobiops* sp., *M. nigrovirgata*, *M. macrostoma* and *Stonogobiops* sp. have such common characteristics as gill membranes connected across the isthmus and the eyes not situated far above the upper lip as in the genera *Cryptocentrus* and *Mars*. The least distance between the eye and upper margin of the upper lip is 21~31% of the eye diameter in *M. nigrovirgata*, 15~34% in *M. macrostoma* and 35% in *Stonogobiops* sp., while it is half or more of the eye diameter in the genera *Cryptocentrus* and *Mars*. Gill membranes which connect across the isthmus are rare in gobiids and they have only been found in the genera *Myersina*, *Stonogobiops* and *Psammogobius* (the last of which is very similar to *Glossogobius biocellatus*) (Dr. D. F. Hoese, pers. comm.) as well as *G. biocellatus*, which is the only species out of twelve species of the genus *Glossogobius* examined (Prince Akihito and Meguro, 1975). *G. biocellatus* cannot be considered to be closely related to the genera *Myersina*, *Cryptocentrus*, *Mars* and *Stonogobiops* because it differs from them in the above mentioned characteristics common to them. The genus *Stonogobiops* is considered to be closely related to the genus *Myersina* but differs from it in the presence of vomerine teeth and toothlike projections on the palatine, from these facts *M. nigrovirgata* is considered to be most closely related to *M. macrostoma*.

Ecologically, *M. nigrovirgata* is also more similar to *M. macrostoma* and the genus *Stonogobiops* than to the genera *Cryptocentrus* and *Mars* which stay on the bottom, while *M. nigrovirgata*, *M. macrostoma* and the genus *Stonogobiops* hover above shelter holes (observations by the collectors of the type specimens in addition to K. Meguro's observation on the Great Barrier Reef in Australia; Polunin and Lubbock, 1977; Dr. D. F. Hoese, pers. comm.). In the case of *M. macrostoma*, Mr. M. Hayashi observed that they fed on zooplankton. Such ecological similarity seems to have some relation to the profiles of *M. nigri-*

*virgata*, *M. macrostoma* and the genus *Stonogobiops*, the eyes of which are situated lower than in the genera *Cryptocentrus* and *Mars.*

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沖縄県で採集された新種 *Myersina nigrivirgata* クロオビハゼ

明仁親王・目黒勝介

沖縄県西表島網取湾奥で採集されたハゼ科の1新種を記載した。本種は両側の鰓膜が陥部を越えて癒合すること、鋤骨の下側中央部に一対の縦走隆起があり、側突起がないこと、眼の後から尾鰭後端にかけて1黒色縦帯があることの特徴を有している。

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